Alizarine Dyes

Wm. Pickhardt & Kuttroff

667.2
P58

FRANKLIN INSTITUTE LIBRARY
PHILADELPHIA

Class 667.2 Book P58 Accession 55671

Given by Mr. Spencer Fullerton

Digitized by the Internet Archive
in 2015

https://archive.org/details/memorandaonaliza00badi

MEMORANDA

ON

ALIZARINE DYES

BY

BADISCHE ANILIN & SODA FABRIK
LUDWIGSHAFEN A/RHINE

WM. PICKHARDT & KUTTROFF
NEW YORK

THE DE VINNE PRESS

CONTENTS.

		PAGE
No. 267.	Proportionate strength of powders and pastes,	5
No. 327.	Directions for dyeing Alizarine Colors on loose wool (chrome mordant),	6
No. 328.	Directions for dyeing Alizarine Colors on wool yarn and slubbing (chrome mordant),	10
No. 328½.	Directions for dyeing even medium and light shades (fancy colors) on wool yarn and slubbing (chrome mordant),	14
No. 329.	Directions for dyeing Alizarine Colors on piece goods (chrome mordant),	16
No. 329½.	Directions for dyeing piece goods to penetrate thoroughly (chrome mordant),	19
No. 365.	Directions for dyeing Alizarine Red WB, WR, WY, and WYY, WA powder, Alizarine Orange WO, Alizarine Garnet, Alizarine Blue NB, NR, NG (alum mordant),	21
No. 376.	Directions for dyeing Alizarine Colors on wool in dyeing machines,	23
No. 377.	Directions for dyeing Alizarine Colors in powder on wool,	25
No. 378.	Directions for dyeing Alizarine Colors on hat felt (chrome mordant),	27
S. 27.	Directions for dyeing black on hat felt in one bath,	28
No. 383.	Directions for dyeing Alizarine Blue B on slubbing in dyeing apparatus,	29
No. 389.	Directions for producing light shades in one bath,	31
No. 391.	Directions for dyeing with Alizarine Red WA powder in one bath,	32
No. 406.	Directions for dyeing indigo shades and light fancy colors with Alizarine Blue, N series,	33
No. 407.	Special directions for dyeing with Alizarine Blue, N series,	35
No. 419.	Directions for dyeing Alizarine Black in one bath on loose wool, slubbing, yarn and piece goods,	36
No. 432.	Directions for dyeing Alizarine Blue NA and NA extra in powder on piece goods in one bath,	37
No. 433.	Directions for dyeing Alizarine Colors on slubbing in one bath (with bichromate of potash—lactic acid—sulphuric acid mordant),	39
No. 379.	Directions for printing Alizarine Colors on wool,	40
No. 424.	Directions for printing Alizarine Colors on slubbing and worsted yarn,	45
No. 408.	Process for bleaching loose wool, yarn, and piece goods,	50
No. 427.	Directions for producing a silky luster and feeling on wool yarn dyed with Alizarine Colors,	52

No. 267.

ALIZARINE DYES.

Proportionate Strength of Powders and Pastes.

Powders.		Pastes.
1 Part Alizarine Red W A Powder	=	about 3 parts Alizarine Red
1 " " " W B A N ...	=	4 " " " W B A
1 " " " W B N	=	4 " " " W B
1 " " " W Y N	=	4 " " " W Y
1 " " Orange S W	=	$5\frac{1}{3}$ " " Orange W O
1 " " Blue S B	=	3 " " Blue S B
1 " " " J S W	=	5 " " " J S W
1 " " Green S W	=	5 " " Green S W
1 " " Garnet.....	=	5 " " Garnet
1 " " Brown S O	=	4 " " Brown O
1 " " Black S B	=	5 " " Black S B
1 " " Blue N R	=	8 " " Blue N R
1 " " " N B.....	=	8 " " " N B
1 " " " N B B.....	=	8 " " " N B B
1 " " " N G	=	8 " " " N G
1 " " " N G G.....	=	8 " " " N G G
1 " Viridine S.....	=	about 4 " Viridine S
1 " Victoria Violet S R	=	8 " Victoria Violet R

No. 327.

ALIZARINE DYES ON WOOL.

Directions for Dyeing Alizarine Colors on loose Wool.

(Chrome Mordant.)

List of the various Alizarine Dyes and the Colors to be obtained from them.

	Dyes on Wool mordanted with **Bichromate of Potash** and Tartar.	Dyes on Wool mordanted with **Alum** and Tartar.
Alizarine Red W B B	bluish claret	crimson
" " W B	" "	"
" " W Y	yellowish claret	scarlet
" " W Y Y	" "	yellowish scarlet
" " W A powder	" "	scarlet
Alizarine Orange W O	brownish orange	bright orange
Alizarine Blue B	bright pure blue	
" " R	reddish blue	
" " S B	bright pure blue	
" " S R	reddish blue	
" " J S W	greenish blue	
" " N G G	" "	
" " N G	" "	
" " N B B	" "	
" " N B	medium blue	
" " N R	reddish blue	
" " N R R	dark reddish blue	
" " N H	full dark pure blue	
" " N D	" " reddish blue	
Alizarine Green S W	blue green	
Viridine S	green	
" paste	"	
Victoria Violet R	dahlia	
Alizarine Garnet	maroon	
Alizarine Brown O	tobacco brown	
" " N	yellowish tobacco brown	
Galloflavine	greenish yellow	
Wool Yellow B	full yellow	
Carbazol Yellow W	lemon yellow	
Alizarine Yellow A W powder	bright lemon yellow	
" " L W "	bright yellow	
" " R W "	reddish yellow	
Alizarine Black S B	from gray to deep black	
" " W B	bluish black	
" " W D	jet black	

ALIZARINE DYES.

Cleaning (Scouring). In order to obtain colors fast to fulling, air and light with alizarine dyes, as with any other coloring matter, the first condition is a thorough cleaning and scouring of the wool.

Mordant. For 100 lbs. of well cleaned wool
3 " bichromate of potash,
2½ " white tartar.

Boil for 1½ to 2 hours, take out the wool, let stand over night in baskets, rinse well. (If only 40 or 60 lbs. are to be mordanted in a kettle which usually serves to mordant 100 lbs. of wool, the mordant should be strengthened to 4 lbs. bichromate of potash and 3 lbs. of tartar for 100 lbs. of wool.) For very light tints the mordant is reduced to 1 lb. bichromate and 1 lb. tartar per 100 lbs. of wool; and for dark shades it is strengthened to 4 lbs. bichromate of potash and 3 lbs. tartar per 100 lbs. of wool.

Dyeing. In the first place, 1 quart of acetic acid of 9° T is added to the dye-bath for every 1000 quarts of water; if the water is very hard, up to 2 quarts of acetic acid are used. It is then best to make sure, by means of litmus paper, that the bath has an acid reaction.

The dye is stirred up with about 10 times as much cold water and is poured into the bath through a fine sieve. The bath may be at a temperature of 104°–122° F. Enter the wool, work cold for ¼ hour, raise to the boiling point, at which it should be maintained for 2–2½ hours.

For shading, the dye-bath is partially drawn off, cooled to 122°–140° F. by adding cold water; the dyeing is then completed by boiling for one hour after introducing the requisite coloring matter in the way described above.

When the dyeing is done in an Obermaier apparatus, it is very important to take care not to raise the temperature of the liquid above 122° F. during the first hour, and to raise to the boiling point only when the bath is nearly exhausted of its color. Then boiling for 1 hour to 1½ hours will suffice to fix the color perfectly and develop it properly.

GENERAL REMARKS.

Fastness of the Alizarine Colors. Wool which has been dyed exactly according to these directions will lose very little in fulling; the traces of color, which are washed off, are in an insoluble form and do not possess any further tinctorial properties. *Hence the colors do not run into the whites.* As regards resistance to wear, they surpass the best indigo blue and madder red. Among other things Alizarine Blue has the great advantage over indigo, that goods dyed with Alizarine Blue do not wear white on the seams. Dyeing with Alizarine Red and Alizarine Orange instead of madder and redwood offers the great advantage that the wool *remains exceedingly soft and spins well.*

If wool, which was dyed with Alizarine dyes, loses much color in fulling, this may always be traced to defective scouring, to mordants of insufficient strength, and to not boiling long enough in dyeing.

Combination of the Dyes among themselves. The Alizarine dyes may be mixed with each other in any proportion. By combining Alizarine Blue with Viridine or Alizarine Green, a greenish blue, and by mixing Alizarine Red with Alizarine Blue, a reddish blue may be obtained, etc.

Combination of the Alizarine Colors with other Dyes. These colors present to the dyer the additional advantage, that he can employ them in combination with all the dyestuffs which he has been accustomed to use. Without further additions, Alizarine colors may be dyed in the same bath with logwood and fustic, and *saddened with copperas.* If very bright tones are required, they may be topped in the same bath with *Fast Blue G* and *any Aniline color.* By adding ½ to 1% Soluble Blue F B or Victoria Blue B to the chrome liquor, and afterwards dyeing with Alizarine Blue, *very brilliant* blues, fast to fulling, may be obtained.

Notwithstanding the long boiling which is indispensable for mordanting and dyeing, the wool remains *soft* and *does not felt.* Boiling too violently must be avoided.

Addition of Acetic Acid. Even when distilled water (from condensation of steam) is used in dyeing, 1 quart of acetic acid of 9° T must be added per 1000 quarts of water because the Alizarine dyes produce their best effects only in the presence of acetic acid. An excess of acetic acid does no harm. On dyeing with *Alizarine Orange and Viridine in mixtures* it is better to use water containing lime and not to add the necessary amount of acetic acid to the dye bath at first, but to wait for an hour and add it in small portions when the bath is boiling during the next two hours. Combinations of Alizarine Orange and Viridine are best replaced by those of Alizarine Brown and Viridine.

On dyeing with Alizarine Green and Alizarine Blue J S W alone or in mixtures with other coloring matters, the acetic acid must not be added to the bath at first, but only when the temperature has reached 158° F., and in small portions at a time.

Keeping Paste Colors. Dyes in the form of paste should be kept in places where they are not exposed to frost, and where the temperature does not rise so high as to dry them up. Every time they are to be used, the contents of the barrels should be stirred thoroughly until the whole mass is homogeneous. It is well to take out the head of the barrel; after using, spread a damp cloth over the barrel and press the head firmly down on it.

Scarlet with Alizarine on Alum or Tin Mordant. To produce *brilliant scarlets* with Alizarine Orange and Alizarine Red, *alum* or *tin mordant* is required; we refer to Directions No. 365.

No. 328.

ALIZARINE DYES FAST TO LIGHT AND FULLING ON WOOL YARN AND SLUBBING.

List of the various Alizarine Dyes and the Colors obtained with them.

	Dyes on Wool mordanted with **Bichromate of Potash** and Tartar.	Dyes on Wool mordanted with **Alum** and Tartar.
Alizarine Red W B	bluish claret	crimson
" " W Y	yellowish claret	scarlet
" " W Y Y	" "	yellowish scarlet
" " W A powder	" "	scarlet
Alizarine Orange W O	brownish orange	bright orange
Alizarine Blue S B	bright pure blue	
" " S R	reddish blue	
" " B	bright pure blue	
" " J S W	greenish blue	
" " N G	" "	
" " N B B	" "	
" " N B	medium blue	
" " N R	reddish blue	
" " N R R	dark reddish blue	
" " N H	full dark pure blue	
" " N D	" " reddish blue	
Alizarine Green S W	blue green	
Viridine S paste	green	
Victoria Violet R	dahlia	
Alizarine Garnet	maroon	
Alizarine Brown O	tobacco brown	
" " N	yellowish tobacco brown	
Galloflavine	greenish yellow	
Wool Yellow B	full yellow	
Carbazol Yellow W	lemon yellow	
Alizarine Yellow AW powder	bright lemon yellow	
" " L W "	bright yellow	
" " R W "	reddish yellow	
Alizarine Black S B	from gray to deep black	
" " W B	bluish black	
" " W D	jet black	

Cleaning (Scouring). In order to obtain colors fast to fulling, light, and air with Alizarine dyes, as with any other coloring matters, the first requisite is a thorough cleaning and scouring of the material.

Mordant. For 100 lbs. of carefully cleaned yarn or slubbing
3 " bichromate of potash,
2½ " white tartar.

Keep at a temperature near the boiling point, say about 203° F., for 1½ to 2 hours, raise and rinse well in cold water. (When the mordanting is done in a vat, intended for 100 lbs. of yarn or slubbing, and only 40 or 60 lbs. are used, the mordant should be strengthened to 4 lbs. bichromate and 3 lbs. tartar per 100 lbs. of yarn or slubbing.) For light tints see Directions No. 328½. For dark shades the strength of the mordant is increased to 4 lbs. bichromate of potash and 3 lbs. tartar.

Dyeing. In the first place, 1 quart of acetic acid of 9° T is added to every 1000 quarts of water; if the water is very hard up to 2 quarts of acetic acid should be used; it is then best to use blue litmus paper in order to make sure that the dye-bath has an acid reaction. The dye, which has been stirred up with 10 times as much cold water, is added through a hair sieve. The yarn or slubbing is well moistened and entered cold at 77°–86° F. After turning 8 times *as rapidly as possible*, heat slowly to 203° F. It is, however, very important to take care that the liquid does not get warmer than 140° F. during the first hour of dyeing, and that the temperature is raised to 203° F. only when the bath is nearly exhausted of color. Subsequent dyeing for 2 hours at a temperature of 203° F. will then suffice for the fixing and proper development of the color. It is necessary to work diligently until the bath has been at 203° F. for about half an hour; after that it will be enough to give a turn once every 15–20 minutes. Violent boiling must be avoided to prevent the yarn or slubbing from felting.

For shading, the bath is partially drawn off, cooled to 122°–140° F. by the addition of cold water, and the dyeing completed by boiling for one hour after adding the required coloring matter in the manner described above. Compare also Directions No. 328½.

GENERAL REMARKS.

Fastness of the Alizarine Colors. The colors obtained in this manner are *exceedingly fast* in every respect; they lose but very little in rinsing and fulling, and when the dyeing has been properly done, they do not crock. The traces of color which are washed off are in an insoluble form and possess no further tinctorial properties. *Hence these colors do not run into the whites.* As regards their fastness to wear, they surpass the best indigo blue and madder red. Among other things Alizarine Blue has the great advantage over Indigo Blue that goods dyed with Alizarine Blue do not wear white on the seams. Dyeing with Alizarine Red and Alizarine Orange in the place of madder and red wood offers the great advantage that the wool *remains extremely soft and spins well.*

When yarn or slubbing which has been dyed with Alizarine dyes loses much color in rinsing or fulling, this may always be traced to imperfect cleaning, to inadequate mordanting, or to insufficient boiling in the dye-bath.

Combination of these Dyes among themselves. The Alizarine dyes may be mixed with each other in all proportions for dyeing. By combining Alizarine Blue with Viridine or Alizarine Green, a greenish blue may be obtained, while a mixture of Alizarine Red with Alizarine Blue yields a reddish blue, etc.

Combination of the Alizarine Dyes with other Dyes. These dyes present moreover the great advantage to the dyer, that he may use them in combination with all other coloring matters he has been accustomed to employ. Alizarine dyes may be used in the same bath with logwood, fustic, etc., without further additions and *may be saddened with copperas.* If very bright tones are required, they may be topped in the same bath with Fast Blue G and any Aniline color. By adding ½% to 1% Soluble Blue F B or Victoria Blue B to the chrome liquor and afterwards dyeing with Alizarine Blue, very brilliant blues, fast to fulling, may be obtained. Notwithstanding the long mordanting and dyeing which are indispensable, the yarn and slubbing remain soft and do not

felt if care is taken not to raise the temperature above 203° F.; violent boiling should be avoided. Dyers who use direct steam for boiling are earnestly advised to use a perforated board above the steam supply pipe so as to prevent the steam from striking the wool directly.

Addition of Acetic Acid. Even when distilled water (from condensation of steam) is used in dyeing, 1 quart of acetic acid of 9° T must be added per 1000 quarts of water, because the Alizarine dyes produce their best effects only in the presence of acetic acid. An excess of acetic acid does no harm. On dyeing with *Alizarine Orange and Viridine in mixtures* it is better to use water containing lime and not to add the necessary amount of acetic acid to the dye-bath at first, but to wait for an hour and add it in small portions when the bath is boiling during the next two hours. Combinations of Alizarine Orange and Viridine are best replaced by those of Alizarine Brown and Viridine.

On dyeing with Alizarine Green and Alizarine Blue J S W alone, or in mixtures with other coloring matters, the acetic acid must not be added to the bath at first, but only when the temperature has reached 158° F., and in small portions at a time.

Keeping Paste Colors. Dyes in the form of paste should be kept in places where they are not exposed to frost, and where the temperature does not rise so high as to dry them up. Every time they are to be used, the contents of the barrels should be stirred thoroughly until the whole mass is homogeneous. It is well to take out the head of the barrel; after using, spread a damp cloth over the barrel, and press the head firmly down on it.

Scarlet with Alizarine on Alum or Tin Mordant. To produce *brilliant scarlets* with Alizarine Orange and Alizarine Red, *alum* or *tin mordant* is required; we refer to Directions No. 365.

No. 328½.

ALIZARINE DYES ON WORSTED YARN AND SLUBBING.

Directions for Dyeing Medium and Light Shades.

Cleaning. To remove any remaining soap and moisten the yarn thoroughly, it is introduced into boiling water and allowed to remain for 3 hours. It is advisable to pass the yarn so treated through a weak ammonia bath, to make perfectly sure that no impurities remain.

Mordanting. In order to avoid felting, the vats for mordanting and dyeing should be provided with closed steam pipes and double bottoms. They should be so deep that the yarn when hung in them does not touch the bottom, and therefore does not get too near the steam pipes. The yarn must not be crowded on the poles, but distributed on as many poles as possible.

For 50 lbs. of yarn, the vat should hold about 2000 quarts of water. For every 1000 quarts of water, 1 quart of acetic acid 9° T (if the water is very hard, 2 quarts) is added, and then the other ingredients, each of which has first been separately dissolved in hot water, are introduced.

50 lbs. of yarn require
1½ " bichromate of potash,
1¼ " white tartar.

After entering the yarn, the mordant liquor is raised to the boiling point; avoiding too violent boiling, work the yarn rapidly. Boiling is continued for 1½ hours. After mordanting, extract as soon as possible in a centrifugal machine and rinse well.

Dyeing. The dye-bath is heated to 104° F., and 3 quarts of *acetate of ammonia* are added for every 1000 quarts of the liquor. The coloring matter is stirred up with ten times as much cold water and added through a fine sieve; enter yarn, work rapidly. In three-quarters of an hour the liquor is heated to boiling, which is continued for half an hour, when 3 quarts of acetic acid 9° T are added per 1000 quarts of liquor. This is done in three portions, the yarn being lifted each time. During this time, the steam is turned off and the yarn is kept in motion. The coloring matter is fixed by boiling for two hours longer.

Shading. For shading, the bath is not cooled down, but the dyeing is continued with the hot liquor. The acetic acid must be neutralized with ammonia, but only to the point of feebly bluing red litmus paper. *An excess of ammonia must be very carefully avoided.* The quantity of ammonia to be added is about 1–1½ quarts per 1000 quarts of dye liquor, and depends on the nature of the coloring matters to be used (the soluble colors: Alizarine Blue S B paste, Viridine S paste, Alizarine Blacks, requiring more ammonia), on the hardness of the water (the lime neutralizing the acetic acid), and on the amount of boiling, by which more or less acetic acid is vaporized.

By the aid of acetate of ammonia, results may be obtained in dyeing worsteds which will satisfy very exacting requirements.

No. 329.

ALIZARINE DYES FAST TO LIGHT AND FULLING ON PIECE GOODS.

(**Chrome Mordant.**)

List of the Various Alizarine Dyes and the colors obtained from them.

	Dyes Wool mordanted with **Bichromate of Potash** and Tartar.	Dyes Wool mordanted with **Alum** and Tartar.
Alizarine Red W B B	bluish claret	crimson
" " W B	" "	"
" " W Y	yellowish claret	scarlet
" " W Y Y	" "	yellowish scarlet
" " W A powder	" "	scarlet
Alizarine Orange W O	brownish orange	bright orange
Alizarine Blue B	bright pure blue	
" " R	reddish blue	
" " S B	bright pure blue	
" " S R	reddish blue	
" " J S W	greenish blue	
" " N G G	" "	
" " N G	" "	
" " N B B	" "	
" " N B	medium blue	
" " N R	reddish blue	
" " N R R	dark reddish blue	
" " N H	full dark pure blue	
" " N D	" " reddish blue	
Alizarine Green S W	blue green	
Viridine paste	green	
Viridine S paste	"	
Victoria Violet R	dahlia	
Alizarine Garnet	maroon	
Alizarine Brown O	tobacco brown	
" " N	yellowish tobacco brown	

Galloflavine .....greenish yellow .....
Wool Yellow B .....full yellow .....
Carbazol Yellow W.....lemon yellow .....
Alizarine Yellow A W powder bright lemon yellow .....
" " L W " bright yellow .....
" " R W " reddish yellow .....
Alizarine Black S B .....from gray to deep black ....
" " W B.....bluish black.....
" " W D.....jet black.....

Cleaning (Scouring). To produce colors fast to fulling, light and air with Alizarine dyes, as with any other coloring matter, a thorough cleaning and scouring of the material is the fundamental requirement.

Mordant. For 100 lbs. of carefully cleaned goods
3 " bichromate of potash,
2½ " white tartar.

Boil for 1½–2 hours, turn out and rinse well in cold water. (If a vat intended for mordanting 100 lbs. of goods is used for only 20 or 40 lbs., the mordant should be strengthened to 4 lbs. bichromate and 3 lbs. tartar per 100 lbs. of goods.) For light tints see directions No. 329½.

Dyeing. 1 quart of acetic acid 9° T is first added for every 1000 quarts of water; if it is very hard it will take 2 quarts. With very hard water it will be best to use blue litmus paper to make sure that the bath has an acid reaction.

The dye is stirred up with 10 times as much cold water and strained into the bath through a fine sieve. The moistened goods are entered *cold* at 77°–86° F., passed through cold for 20 minutes, and then slowly heated to boiling. It is very important, however, to take care not to allow the liquor to get hotter than 140° F. during the first hour, and to raise to boiling only when the liquor is nearly exhausted of its color.

It will then suffice for fixing and properly developing the color to continue the operation for 2–2½ hours at boiling heat.

For shading, the dye-bath is partially drawn off and cooled down to 122°–140° F. by adding cold water; then, after adding the requisite coloring matter in the manner indicated above, the dyeing is completed by boiling for one hour. (See also directions No. 329½.)

GENERAL REMARKS.

Fastness of the Alizarine Colors. The colors obtained in this manner are *exceedingly fast* in every respect; they lose but very little in rinsing and fulling, and when the dyeing has been properly done, they do not crock. The traces of color which are washed off are in an insoluble form, and possess no further tinctorial properties. *Hence these colors do not run into the whites.* As regards their fastness to wear, they surpass the best indigo blue and madder red. Among other things Alizarine Blue has the great advantage over Indigo Blue that goods dyed with Alizarine Blue do not wear white on the seams. Dyeing with Alizarine Red and Alizarine Orange in the place of madder and red wood offers the great advantage that the wool *remains extremely soft and spins well.*

When yarn or slubbing which has been dyed with Alizarine dyes loses much color in rinsing or fulling, this may always be traced to imperfect cleaning, to inadequate mordanting or to insufficient boiling in the dye-bath.

Combination of these Dyes among themselves. The Alizarine dyes may be mixed with each other in all proportions for dyeing. By combining Alizarine Blue with Viridine or Alizarine Green, a greenish blue may be obtained, while a mixture of Alizarine Red with Alizarine Blue yields a reddish blue, etc.

Combination of the Alizarine Dyes with other Dyes. These dyes present, moreover, the great advantage to the dyer, that he may use them in combination with all other coloring matters he has been accustomed to employ. Alizarine dyes may be used in the same bath with logwood, fustic, etc., without further additions, and *may be saddened with copperas.* If very bright tones are required, they may be topped in the same bath with Fast Blue G and any Aniline color. By adding ½ to 1% Soluble Blue F B, or Victoria Blue B to the chrome liquor, and afterwards dyeing with Alizarine Blue, very brilliant blues, fast to fulling, may be obtained. Notwithstanding the long mordanting and dyeing which are indispensable, the yarn and slubbing remain soft and do not felt if care is taken not to raise the temperature above 203° F.; violent boiling should be avoided. Dyers who use direct steam for boiling are earnestly advised to use a perforated board above the steam-supply pipe so as to prevent the steam from striking the wool directly.

No. 329½.

ALIZARINE DYES ON PIECE GOODS.

Directions for Dyeing Heavy Weight Goods and Light Shades Evenly.

Mordant. The pieces, which have been carefully washed and rinsed, are boiled for about ½ an hour with pure water in order to remove the last traces of soap and thoroughly moisten the goods. To the mordant bath is then added for every 1000 quarts 1 quart of acetic acid 9° T (30%), or 2 quarts if the water is very hard; and then for every 50 lbs. of goods 1½ lbs. of bichromate of potash and 1¼ lbs. of white tartar, each dissolved separately, are added one after the other. After raising this bath to the boiling point, the goods are entered. The reel is run as rapidly as possible at first and is slowed up after about 20 minutes. After boiling for 1½ hours the goods are raised, extracted and carefully rinsed.

Dyeing. The dye-bath is raised to 104° F. and 3 quarts of *acetate of ammonia* are added for every 1000 quarts of liquor. The coloring matter is stirred up in about 10 times as much cold water, strained into the bath through a fine sieve and stirred well. The goods are then entered, the reel is run as rapidly as possible at this point also, and the liquor is brought to a boil in about three-quarters of an hour. To dye the goods completely through, the boiling must be continued for ¼ to ¾ of an hour according to their closeness of texture. Samples taken out from time to time will show how far the operation has progressed. When the goods are perfectly impregnated with the coloring matter they are raised, and 3 quarts of acetic acid 9° T. (30%) are added in 3 portions for every 1000 quarts of dye-liquor at intervals of ¼ of an hour, the goods being raised each time before the addition and

worked very rapidly afterwards. During the time the acetic acid is added the steam should be turned off. The coloring matters are finally set by boiling for two hours.

For *shading,* the bath need not be cooled down. The acetic acid is neutralized with ammonia after turning off the steam. Red litmus paper should be blued but slightly. *An excess of ammonia must be carefully avoided.* The additional coloring matter is now introduced, and the operation is the same as described above. The quantity of ammonia to be used is about 1–1½ quarts per 1000 quarts of the liquor, being larger where coloring matters such as Alizarine Blue S B, Viridine S, Alizarine Blacks are mostly used which are soluble in water. The amount of boiling and the consequent evaporation of acetic acid will also influence the quantity of ammonia required, and so will, finally, the hardness of the water, the lime of which neutralizes the acetic acid.

By the aid of acetate of ammonia, results may be obtained in dyeing which will satisfy very exacting requirements as regards uniformity and penetration.

No. 365.

ALIZARINE DYES ON ALUM MORDANT.

Directions for Dyeing with Alizarine Red W B, W, W Y, W Y Y; and W A powder; Alizarine Orange W O and Alizarine Garnet, Alizarine Blue N R, N B, N G, on Alum Mordant.

Mordant. The well-cleaned wool is boiled for 1½ hours with

10% alum,
3% tartar,
2% oxalic acid,

and well rinsed.

Dyeing. 1) *Alizarine Red W B, W, W Y, W Y Y, Alizarine Orange W O and Alizarine Garnet, Alizarine Blue N R, N B, N G.*

The coloring matter is stirred up uniformly in cold water and strained into the dye-bath through a sieve. Then for every pound of coloring matter, add

3¼ oz. *acetate of lime* dissolved in hot water,
1¾ " *Castile soap*, dissolved in hot water,
¾ " *tannin*.

The goods are entered cold into the dye-bath. Heat slowly for ¾ of an hour to the boiling point and maintain at this temperature for 1½ hours.

2) *Alizarine Red W A Powder.*

The coloring matter is dissolved in hot water and strained into the dye-bath through a sieve. Then for each pound of Alizarine add

8 oz. *acetate of lime* dissolved in hot water,
4 " *Castile soap* dissolved in hot water,
2 " *tannin.*

Enter cold into the dye-bath, heat slowly in ¾ of an hour to the boiling point, and after boiling for one hour add 3 quarts of acetic acid 9° T. (30%) for every 1000 quarts of dye-liquor and boil for ½ an hour more.

The addition of soap to the dye-kettle is only for loose wool which is subjected to heavy fulling; it must be omitted in dyeing yarn and piece goods.

The colors produced by this method do not change their tint in the slightest degree, even with very severe fulling.

In order to make the tints somewhat more lively, a little tin salt may be put in the mordant or else in the dye-bath. A mordant of

10% alum,
3% tartar,
2% oxalic acid,
0.5–1% tin salt,

may be recommended, or 1½–3 oz. of tin salt may be added to the dye-bath for every pound of coloring matter.

The dyeing should be performed in tinned copper kettles, or in wooden vats. Copper kettles make the colors somewhat duller, but this can be remedied by brightening with tin salt.

Iron vessels should be avoided on account of the tannin.

For producing tints by means of mixture of Alizarine Red W B, etc., and Alizarine Red W A powder, the amount of acetic acid to be added is the same as recommended for *Alizarine Red W A* powder.

For light tints which require little coloring matter, it is well to use a weaker mordant, as for example:

5.0% alum,
1.5% tartar,
1.0% oxalic acid.

No. 376.

ALIZARINE DYES ON WOOL.

Directions for Dyeing with Alizarine Colors on Wool in Dyeing Machines.

The loose wool, which has been carefully cleaned, or the slubbing, which must be wound very loosely or placed open in the apparatus, is introduced into the dyeing machine well moistened and without strong pressure.

Then a mordant is added which consists

for 100 lbs. of wool, of
3 " bichromate of potash or soda, and
2½ " white tartar,

each dissolved separately in hot water. Boil for 1½ hours and wash well.

To the dye-bath 1 quart of commercial acetic acid 9° T (30%) is added for every 1000 quarts of water. If the water is very hard (contains much lime), a proportionally larger quantity of acetic acid is required. (See method No. 327.)

The colors are stirred up with water, the soluble ones being dissolved in cold water, and added to the dye-bath. In order to distribute them uniformly, the cold dye-liquor is agitated for ¼ of an hour. It is then slowly heated to boiling, taking about an hour to reach that temperature, which is then maintained for 2 hours more, then rinse well.

To obtain brilliant scarlet, red and orange hues with Alizarine Red and Alizarine Orange, alumina mordant is used (method No. 365); the practical operation of dyeing is conducted as described above.

For *Alizarine Blue S B in powder or paste*, the process must be somewhat modified. The mordanting is done as described above. After dyeing cold for ¼ of an hour, the temperature is raised only to 122°–140° F., *taking half an hour to do so; this temperature is then maintained for ½—¾ of an hour, until the bath is nearly exhausted.* Not until then is the temperature raised to the boiling point, at which it must be kept for 2 hours more. It is essential not to heat the dye-liquor above 140° F. in the first stage of the process, because the Alizarine Blue is separated as a frothy mass at a higher temperature and is then very difficult to fix on the wool. When much foam is formed on the surface of the dye-liquor, it is a sign that it has been heated too rapidly or has reached too high a temperature. For very dark shades, which require much dye, it is advisable to continue the boiling still longer, say for about 3 hours, in order to fix all the coloring matter.

Alizarine Green S W in paste and Alizarine Blue J S W in paste are used in dyeing like Alizarine Blue S B in paste or powder, with the exception that the acetic acid is added only when 158° F. are reached, and in small portions.

No. 377.

ALIZARINE DYES IN POWDER ON WOOL.

Directions for Dyeing with Alizarine Colors in Powder on Wool.

I.

Alizarine Red W B N Powder,
" " *W B A N Powder,*
Alizarine Orange S W Powder,
Alizarine Brown S O Powder,
Victoria Violet S R Powder,
Alizarine Green S W Powder,
Alizarine Blue J S W Powder,
Alizarine Blue S N R Powder,
" " *S N B Powder,*
" " *S N G Powder.*

a) Chrome Mordant.

The goods are mordanted by boiling for 1½ hours with

3.0% bichromate of potash,
2.5% white tartar,

and washed well.

The coloring matter is dissolved in 20 times its weight of hot water, and the solution is strained into the dye-bath through a fine sieve of hair or brass wire. Then the goods to be dyed are entered, the temperature is raised slowly in ½ an hour to 140° F., and for 2 lbs. of coloring matter 1 quart of commercial acetic acid of 9° T (30%) is added gradually in small portions within

½ an hour. By this means the coloring matter is slowly precipitated from the solution and at the same time fixed upon the goods.

Then the heat is slowly raised to boiling, taking ½ an hour to do so; add 1 more quart of commercial acetic acid 9° T, or, if the water is very hard, 2 quarts for every 1000 quarts of dye-liquor, and boil for 2 hours.

b) Alumina Mordant.

Only *Alizarine Red W B N* and *W B A N*, *Alizarine Orange S W powder* are suitable for dyeing on alumina mordant; the operation is performed according to Directions No. 365.

II.

Alizarine Red W A powder,
Alizarine Blue S B powder,
Viridine S powder,
Alizarine Black S B Powder,
Carbazol Yellow W,
Alizarine Yellow A W powder,
" " *L W powder,*
" " *R W powder.*

These coloring matters are dyed on chrome mordant according to Directions Nos. 327, 328, 328½, 329 and 329½. Alizarine Red W A powder, Alizarine Garnet are also dyed on alumina mordant according to Directions No. 365.

Directions for Dissolving.

The above-named coloring matters are dissolved in about 20 times their weight of pure water:

1) *In cold water:*

Alizarine Blue S B powder,
Alizarine Black S B powder.

2) *In hot water:*

All the other dyes.

The solution is poured in the dye-bath through a fine hair or brass sieve.

No. 378.

ALIZARINE DYES ON HAT-FELT.

Directions for Dyeing with Alizarine Dyes on Hat-Felt with Chrome Mordant.

For 100 *lbs. of Soft or Stiffened Wool or Fur-Felt for Hats.*

The hats are boiled for ½ an hour in water to wet them through completely and remove any soap that may have remained in them. Then they are mordanted by boiling in a fresh bath of

3.0 lbs. bichromate of potash,
2.5 " white tartar,

for 1½ hours. This bath should be at the boiling temperature before the goods are entered. *The ingredients are dissolved each by itself* in boiling water, and poured *separately* into the kettle. The mordanted goods are carefully rinsed.

The dye-bath is heated to 158° F. and 3 quarts of *acetate of ammonia* are added to every 1000 quarts of dye-liquor. The coloring matter, which has meanwhile been stirred up with warm water, is strained into the dye-bath through a fine sieve.

Stir up carefully and enter the goods. Now keep in motion for ¼ of an hour at 158° F., raise to a boil in ¼ of an hour more and continue the boiling for about ½ an hour. When a hat taken out as a sample is found to be well impregnated with the coloring matter, 3 quarts *of acetic acid of* 9° T (30%) are added for every 1000 quarts of dye-liquor, the acid having previously been diluted with water. This addition is made in 5 instalments at intervals of 5 minutes each, and then the coloring matters are fixed or set by boiling for two hours.

For light and very delicate tints, it is recommended to begin dyeing at about 86° F.

The time it takes for the operation before the addition of the acid will depend on the nature of the material; it will take less time for thin, lightly fulled hat-felt, and considerably more for densely fulled goods.

One hour's boiling suffices for the closest hat-felt.

If the desired tint is not obtained at once, but must be made by shading, the liquor is cooled down to about 140° F., and the acetic

acid is neutralized with ammonia, by which means the bath is again made to contain acetate of ammonia.

Red litmus paper should only be colored with a very slight blue, and *an excess of ammonia must be carefully avoided.* The amount of acetic acid given above requires 1 to 1.5 quarts of ammonia of 20% to neutralize it. The subsequent treatment is done in the manner described before.

The quantity of ammonia required for neutralizing will not always be the same; for example, where soluble varieties such as Alizarine Blue S B paste, Viridine S, Alizarine Black S B paste, are chiefly used, more ammonia will be requisite than with the other Alizarine dyes. The hardness of the water, by which a portion of the acetic acid is neutralized, and more or less violent boiling by which more or less acetic acid is volatilized, will also influence the quantity of ammonia required. According to the directions given above, hats may be dyed with Alizarine by the aid of acetate of ammonia so as to show great uniformity, well covered edges, and well penetrated. In the case of stiff hats, the stiffening will not be impaired; the color will also be uniform and will have penetrated sufficiently for the subsequent operations.

Besides their great fastness and their convenience of working, the Alizarine dyes offer the appreciable advantage that they do not give rise to the spots which so frequently make their appearance in finishing hats dyed with wood dyes.

S 27.

Directions for Dyeing Black on Hat-Felt in one Bath.

Add to the dye-bath

for fur hat-felt,

23% Alizarine Black W D paste,
13 " Alizarine Blue N G paste;

for wool-felt,

15% Alizarine Black W D paste,
15 " Alizarine Blue N G paste;

enter boiling and boil for ¼ hour; then add

1 quart acetic acid 9° T (30%),

per 1000 quarts of dye-bath, and boil ¼ hour more.

Finally add 3% bichromate of potash,

and boil for ¾ hour.

No. 383.

ALIZARINE BLUE B PASTE

on Slubbing in Dyeing Apparatus.

The slubbing is washed with a weak, luke-warm solution of ammonia and rinsed well.

Mordant. For 100 lbs. of slubbing

3 " bichromate of potash,
2½ " white tartar.

Boil for 1½ hours, rinse well in clean water until the liquid runs off colorless.

In Giessler's apparatus, the mordant for light and medium colors consists, *according to the fineness of the slubbing*, of

2 to 4 lbs. bichromate of potash,
1½ to 3½ lbs. tartar,

while dark shades require

4 to 6 lbs. bichromate of potash,
3½ to 5 lbs. tartar.

This increase in the strength of the mordant is necessary because the quantity of liquid in this apparatus is relatively large.

Dyeing. The dye-bath is raised to 140° F., the coloring matter, which has been previously stirred up with 4 to 5 times as much water, is strained into the bath through a sieve, the goods are entered and the liquor is brought to a boil in about ½ an hour. After boiling for 1½ hours, the coloring matter is completely exhausted for light tints and nearly so when working for dark ones. Then, the necessary quantity of acetic acid is added in several in-

stalments. This quantity depends on the amount of lime contained in the water, and on the amount of coloring matter which has been used. The liquor should have an acid reaction, for which it takes 1 to 3 quarts of acetic acid for every 1000 quarts of water. The acetic acid must previously be diluted with 20 times as much water. After boiling for one hour, the operation is completed.

Shading can be done with Alizarine Blue B paste *at a boiling heat before the addition of the acetic acid.* If coloring matter is required after the addition of acetic acid, the acid must either be first neutralized, or else the shading must be done in a fresh bath.

If the slubbing is packed closely, it is advisable to use the coloring matter in two portions, the first half of which is to be taken up in ½ an hour. The second half can be added while the liquor is boiling.

No. 389.

ALIZARINE COLORS ON WOOL.

Directions for Dyeing Light Colors in one Bath.

The material to be dyed, cloth or yarn, is thoroughly scoured and well wetted through.

For 100 lbs. of goods add to the dye-bath

3 lbs. of alum (free from iron),
2 " oxalic acid,

as well as the requisite amount of coloring matter, the latter being stirred up with 20 to 30 times as much water, and poured through a fine sieve. Then enter cold at 77° to 86° F., work cold for about 20 minutes and heat slowly, taking 1 hour to reach the boiling point. Keep boiling for 1 hour more.

No. 391.

ALIZARINE RED W A POWDER, ONE DIP.

Directions for Dyeing Alizarine Red W A Powder in one Bath.

For dyeing Alizarine Red W A in one bath, water free from lime (condensed water) is best suited. If the water used contains little lime, the shade obtained will not be affected to any noticeable extent; if, however, the water be harder, the action of the lime is to be neutralized by adding $\frac{3}{4}$ oz. crystallized oxalic acid per 200 gallons of water.

To obtain an intense Red, prepare the dye-bath, after having corrected the water as required, for

100 lbs. wool with
5 " Alizarine Red W A powder (dissolved in hot water and passed through a sieve),
5 " Alum (free from iron),
5 " Glauber Salts;

enter cold, heat slowly within 1 hour to boiling point, and maintain this temperature for an hour and a half.

Tinned copper vessels or wooden vats should be used for dyeing, the action of copper rendering the shade duller.

Acetic acid need not be added to the dye-bath, the water being corrected by oxalic acid as above stated.

No. 406.

Directions for Dyeing Indigo Shades and Light Fancy Colors with Alizarine Blue N series.

The treatment of the goods to be dyed is in general the same as directed for the Alizarine dyes.

The following method of mordanting and dyeing is better for indigo shades and light fancy colors than the one generally used.

The mordant consists of acetate of chrome and oxalic acid; the proportions vary according to the shade.

For the *lighter fancy colors* (up to 3% of coloring matter), take for 100 lbs. of loose wool, yarn or piece goods,

3 lbs. acetate of chrome 20° Bé,
1½ " oxalic acid,

and dye in *one bath.*

To use Alizarine Blue, for imitating indigo shades, proceed as follows:

For *very light tints*, requiring 0.5 to 1% of *Alizarine Blue in paste*, mordant as above and dye also in *one bath.*

For *shades* produced with about 2% of *Alizarine Blue*, use the same amount of acetate chrome and oxalic acid, but dye in a *fresh bath.*

The mordant for *coloring matter up to* 3% is as follows per 100 lbs. of goods:

4 lbs. acetate of chrome 20° Bé,
1½ " oxalic acid.

For *medium colors* requiring 4 to 10% of coloring matter, 100 lbs. of material are mordanted with

6 lbs. acetate of chrome 20° Bé,
2½ " oxalic acid.

For *dark shades* up to 16% of coloring matter, 100 lbs. require

9 lbs. acetate of chrome 20° Bé,
2½ " oxalic acid.

For *very dark shades*, the mordant for 100 lbs. is composed of

2 lbs. bichromate of potash,
6 " acetate of chrome 20° Bé,
2 " oxalic acid.

On mordanting, enter at about 122° F., raise to boiling in the space of ½ hour and keep boiling for 1½ hours. After mordanting rinse well.

To dye colors *in one bath*, add to the dye-bath mordant and coloring matter, the latter stirred up with about 10 times as much water, through a fine sieve. Then enter cold at 77° to 86° F., work about 20 minutes, heat slowly, taking 1 hour to reach the boiling point and keep boiling for 1½ hours.

When *two baths* are used, add first 1 quart of acetic acid 9° T per 1000 quarts of water. When the water is very hard, add 1½ quarts of the acid. The dye is stirred up with about 10 times as much cold water and added to the bath through a fine sieve. Enter cold, raise to a boil as above and keep boiling for 2 hours, or for very dark shades, for 2½ hours.

For shading, the bath must be cooled down to about 122° to 140° F. as directed for Alizarine dyes.

No. 407.

ALIZARINE BLUE "N" SERIES.

Like the other Alizarine colors, Alizarine Blue N series is dyed according to our Directions No. 327, 328, 328½, 329, 329½. The following are a few points that deserve especial attention:

As is generally known, and as we have insisted in our directions, the Alizarine colors require prolonged boiling in the dye-bath to fix them perfectly and make them fast. This is especially true for the different brands of Alizarine Blue N series, which must be boiled at least 2 hours. For darker shades, from about 10% of coloring matter up, boiling must be continued for 2½ to 3 hours. If this length of time is not observed, or if the bath does not reach the boiling temperature of water or only approximately (at least 203° F.), the colors retain a redder tone and the coloring matter is insufficiently fixed; but if the time of boiling and the temperature of the bath are correct, the shades shown in our sample cards will be obtained.

Care must be taken, moreover, to add to the dye-bath a sufficient quantity of acetic acid, using
for very soft water

1 to 1½ quarts per 1000 quarts of water, and

for harder water

2 to 3 quarts per 1000 quarts of water.

For very hard water, acetic acid should be added until blue litmus paper indicates an acid reaction by turning distinctly red.

When the water is very hard, it is further recommended to add a corresponding quantity of acetic acid to the chrome mordant.

Finally, we call attention to the fact that when 15% and more of Alizarine Blue N series is used, the strength of the chrome mordant must be increased to

4% bichromate of potash and
3% tartar.

No. 419.

Directions for Dyeing Alizarine Black in one Bath on Loose Wool, Slubbing, Yarn and Piece Goods.

According to the hardness of the water, add from 1 to 3 quarts of acetic acid 9° T per 1000 quarts of water to the dye-bath, the temperature of which should not exceed 122° F. at the beginning. Then the necessary amount of coloring matter is stirred up with 5 times as much water, and poured in through a fine sieve. Enter the goods, take ½ hour to heat to boiling and keep boiling for 1 hour. Then add to the dye-bath, little by little, bichromate of potash amounting to 1½% of the weight of the goods dissolved in 30 times as much hot water. While this is going on, the steam must be turned off; and for yarn and piece goods, the dye-bath must be cooled down to about 176° F. by adding cold water. After adding the bichromate of potash, boil for 1 hour, by which the coloring matter will be fixed.

Alizarine Black W D, shaded with a little Alizarine Red W A powder, is especially adapted for dyeing according to the preceding directions.

Other Alizarine coloring matters, for example, Alizarine Blue N series, may be used for shading, but it is best to add them only at the end of the operation, and then to boil for ½ hour more.

After dyeing, the goods must be very well rinsed.

Working by these directions is attended by the great advantage that the same dye liquor may be used several times in succession with the same result.

No. 432.

Directions for Dyeing Alizarine Blue N A powder, Alizarine Blue N A extra powder, on Piece Goods in one Bath.

To produce colors fast to light, air and rubbing with *Alizarine Blue N A*, or *N A extra powder*, in one bath, the first condition of success is to clean the material thoroughly.

If the cleaned goods are not already wet, they must be boiled in water for $\frac{1}{4}$ hour.

To prepare the dye-bath, take 50 quarts of cold water per 2 lbs. of goods. Add 1 quart acetate of ammonia per 1000 quarts of water, and an amount of oxalic acid equal to 4% of the weight of the goods. Dissolve the coloring matter in about 10 times as much boiling water, and pour it into the bath through a fine sieve. After stirring well, enter the goods, work cold for about ten minutes, heat slowly to boiling, taking $\frac{3}{4}$ hour to reach that temperature, and boil for 1 hour.

Then add an amount of fluoride of chrome equal to 3% of the goods, dissolved in about 10 times as much boiling water, to the bath through a sieve. If the rear of the tub is provided with a perforated partition, the mordant can be added, little by little, without taking out the goods; if not, they must be taken out before the fluoride of chrome is added.

After the mordant has been added, raise again to a boil and keep boiling for $\frac{1}{2}$ an hour.

For goods woven closely and vigorously fulled, only one half the amount of oxalic acid is used at the beginning. The remainder is dissolved in about 100 times as much water and added after the bath has been heated to 140° F., in 4 portions, while the bath is being gradually brought to a boil.

By exactly observing the preceding directions, we obtain the prescribed shade of color, on Prussian Infantry melton for example, with 1¾% of Alizarine Blue N A extra powder. As for other lighter fabrics (serges, cheviots), an addition of 2½% of fluoride of chrome is sufficient.

The dyed goods need not be washed with clay; thorough washing with water in a washing machine will be enough.

If clay is necessary in some cases, the color will be made a little more greenish by it. After removing the clay it is recommended to add a little acetic acid (about 1 quart per piece) to the wash water and to rinse with pure water.

If boiling with fluoride of chrome is continued for more than ½ hour, the colors become greenish. When redder tones are wanted, ½ to 1% of oxalic acid is added to the mordant at the same time.

The blue tones obtained may be shaded by adding Alizarine Black W D, Alizarine Red W A powder, Alizarine Orange W O, Alizarine Yellow A W powder, at the same time with Alizarine Blue N A or N A extra powder.

For very dark blues an addition of Acid Black B E is recommended, unless military or other uniform cloths are to be dyed. This coloring matter is also added to the bath at the beginning of the operation.

Goods that show a tendency to dark selvedges in the two-bath process, owing to their containing shoddy or from other causes, are dyed quite evenly according to the preceding directions.

No. 433.

Directions for Dyeing Alizarine Colors on Slubbing in one Bath

(Bichromate of Potash — Lactic Acid — Sulphuric Acid Mordant).

For 100 lbs. of Slubbing.

The slubbing is put in the apparatus wound as loosely as possible or unwound, having been first well moistened.

Then add the mordant, using for medium and dark shades

1½ lbs. bichromate of potash,
3 " lactic acid 50%,
1½ " sulphuric acid 66° Bé,

the first two each dissolved separately in hot water.

For light tints, requiring 3% of coloring matter or less, half the above quantities should be used.

At the beginning, the temperature of the mordant bath should be about 86° F.; heat slowly, taking about ¾ hour to bring to a boil, and continue boiling for about ¼ hour, when the bath should be completely exhausted.

For hard water, a correspondingly larger quantity of sulphuric acid is needed; the correct amount can be recognized by the fact that the bath is completely exhausted.

By drawing off a portion of the liquor, and adding cold water, the bath is now cooled to about 140° F., the coloring matter is stirred up in about 10 times as much cold water, and poured in through a sieve, and the temperature is raised to a boil in the space of about ¾ hour.

After boiling for one hour, add to each 1000 quarts of water in the dye-bath, 2 quarts of acetic acid 9° T diluted with water, gradually in small portions, and boil for one hour more. For very light colors, 1 quart of acetic acid 9° T is sufficient for 1000 quarts of dye-bath. With hard water the amount of acetic acid must be correspondingly increased.

The construction of the various dyeing apparatus mostly requires modifications of the process described above, so that no directions of universal application can be given.

No. 379.

Directions for Printing Alizarine Dyes on Wool.

Before printing, the wool is treated with chlorine, by which the capacity of the fiber for the reception of colors is considerably increased. The goods are placed in a bath of 1% hydrochloric acid of 20° Bé and worked while 2½ quarts of a solution of chloride of lime or, better, chloride of soda of 1° Bé per lb. of goods are added slowly in small portions. After standing for one hour, the goods are washed well and dried.

The goods thus prepared are printed with Alizarine colors as follows:

Printing Colors.

a) Printing with Alumina Mordant.

1. *Alizarine Red W B B, W Y extra, W Y Y.*

100 gr. Alizarine Red,
40 " sulphate of alumina, dissolved in
100 " water,
20 " oxalic acid, dissolved in
50 " water,
50 " glycerine,
50 " Turkey Red oil D concent.,
590 " starch thickening.

1000 grammes.

2. *Alizarine Red W A powder.*

30 gr. Alizarine Red W A powder dissolved in
100 " water,
40 " sulphate of alumina, dissolved in
100 " water,
20 " oxalic acid, dissolved in
50 " water,
660 " starch thickening.

1000 gr.

3. *Alizarine Orange W O.*

150 gr. Alizarine Orange W O,
40 " sulphate of alumina, dissolved in
100 " water,
20 " oxalic acid, dissolved in
50 " water,
50 " glycerine,
590 " starch thickening.

1000 gr.

b) Printing with Chrome Mordant.

4. *Alizarine Red W B B, W Y extra, W Y Y.*

100 gr. Alizarine Red,
75 " acetate of chrome 20° Bé (made from crystals),
50 " acetic acid 9° T,
50 " glycerine,
725 " starch thickening.

1000 gr.

5. *Alizarine Red W A powder.*

30 gr. Alizarine Red W A powder, dissolved in
100 " water,
75 " acetate of chrome 20° Bé (made from crystals),
20 " oxalic acid, dissolved in
50 " water,
725 " starch thickening.

1000 gr.

6. *Alizarine Orange W O.*

150 gr. Alizarine Orange W O,
75 " acetate of chrome 20° Bé (made from crystals),
50 " acetic acid 9° T,
50 " glycerine,
675 " starch thickening.

1000 gr.

7. *Victoria Violet R.*

300 gr. Victoria Violet R,
30 " acetate of chrome 20° Bé (made from crystals),
670 " starch thickening.

1000 gr.

8. *Viridine S paste.*

100 gr. Viridine S paste, stirred up with
100 " water,
30 " oxalic acid, dissolved in
50 " water,
40 " acetate of chrome 20° Bé (made from crystals),
50 " glycerine,
630 " starch thickening.

1000 gr.

9. *Alizarine Blue S B paste.*

200 gr. Alizarine Blue S B paste,
20 " acetate of chrome 20° Bé (made from crystals),
50 " glycerine,
730 " starch thickening.

1000 gr.

10. *Galloflavine.*

100 gr. Galloflavine,
20 " acetate of chrome 20° Bé (made from crystals),
50 " glycerine,
830 " starch thickening.

1000 gr.

11. *Alizarine Brown O.*

100 gr. Alizarine Brown O,
70 " acetate of chrome 20° Bé (made from crystals),
5 " oxalic acid, dissolved in
25 " water,
50 " glycerine,
750 " starch thickening.

1000 gr.

12. *Alizarine Black S P paste.*

250 gr. Alizarine Black S P paste,
50 " acetic acid 9° T.,
100 " acetate of chrome 20° Bé (made from crystals),
30 " oxalic acid, dissolved in
50 " water,
520 " starch thickening.

1000 gr.

13. *Alizarine Green S W paste.*

150	gr.	Alizarine Green S W paste,
50	"	acetic acid 9° T.,
50	"	acetate of chrome 20° Bé (made from crystals),
50	"	oxalic acid, dissolved in
50	"	water,
50	"	glycerine,
600	"	starch thickening.
1000	gr.	

14. *Alizarine Blue J S W paste.*

150	gr.	Alizarine Blue J S W paste,
50	"	acetic acid 9° T.,
50	"	acetate of chrome 20° Bé (made from crystals),
50	"	oxalic acid, dissolved in
50	"	water,
50	"	glycerine,
600	"	starch thickening.
1000	gr.	

15. *Alizarine Blue N R paste.*

200	gr.	Alizarine Blue N R paste,
60	"	acetic acid 9° T.,
60	"	acetate of chrome 20° Bé (made from crystals),
15	"	oxalic acid, dissolved in
35	"	water,
50	"	glycerine,
580	"	starch thickening.
1000	gr.	

16. *Alizarine Blue N B paste.*

200	gr.	Alizarine Blue N B paste,
60	"	acetic acid 9° T.,
60	"	acetate of chrome 20° Bé (made from crystals),
15	"	oxalic acid, dissolved in
35	"	water,
50	"	glycerine,
580	"	starch thickening.
1000	gr.	

17. *Alizarine Blue N G paste.*

200	gr.	Alizarine Blue N G paste,
60	"	acetic acid 9° T.,
60	"	acetate of chrome 20° Bé (made from crystals),
15	"	oxalic acid, dissolved in
35	"	water,
50	"	glycerine,
580	"	starch thickening.
1000	gr.	

18. *Alizarine Yellow A W or R W powder.*

20	gr.	Alizarine Yellow A W or R W powder, dissolved in
160	"	water,
50	"	acetic acid 9° T.,
100	"	acetate of chrome 20° Bé (made from crystals),
20	"	oxalic acid, dissolved in
50	"	water,
600	"	starch thickening.
1000	gr.	

19. *Carbazol Yellow W (Chrome Mordant).*

20	gr.	Carbazol Yellow W, with
830	"	starch thickening, heated until the color is dissolved, then stirred until cold,
50	"	acetate of chrome 20° Bé (made from crystals),
50	"	oxalic acid, dissolved in
50	"	water.
1000	gr.	

20. *Carbazol Yellow W (without Mordant).*

20	gr.	Carbazol Yellow W, with
880	"	starch thickening, heated till the color is dissolved, then stirred until cold,
50	"	oxalic acid, dissolved in
50	"	water.
1000	gr.	

The goods are steamed *without drying* at a pressure of $\frac{1}{4}$ atmosphere for 1 hour, washed well and soaped lightly.

No. 424.

Directions for Printing Alizarine Dyes on Slubbing and Worsted Yarn.

The Alizarine dyes may be printed either on unprepared or on prepared (chlorinated) slubbing or worsted yarn. By the use of chlorine, the power of the fiber for taking up coloring matter is considerably increased, but the wool does not felt quite so well.

The following are suitable for printing on unprepared slubbing or worsted yarn:

Alumina and Chrome Mordant.

Alizarine Orange W O,
Alizarine Red W A powder,
Alizarine Red W R, W B, W Y.

Chrome Mordant.

Alizarine Blue, N R, N B, N G,
Victoria Violet R,
Galloflavine,
Alizarine Yellow A W or R W powder.

The following are suitable for printing on prepared slubbing or worsted yarn:

Chrome Mordant.

Alizarine Orange W O,
Alizarine Blue S W,
Alizarine Blue J S W,
Alizarine Green S W,
Viridine S,
Alizarine Black S P,
Alizarine Blue N D.

Chlorinating.

The slubbing or the worsted yarn is placed in a bath containing $\frac{2}{5}$ oz. hydrochloric acid 20° Bé for every quart of water and worked while $5\frac{1}{2}$ lbs. of a solution of chloride of lime (or, better, chloride of soda) of 1° Bé, are slowly added for every $2\frac{1}{5}$ lbs. of goods. After standing for 1 hour, the goods are well washed and dried.

Thickening.

22 lbs. British gum are boiled with
6 quarts water
for ¼ hour and stirred until cold.

Steaming and Washing.

The slubbing or the worsted yarn is steamed without drying for 1 hour at a pressure of ¼ atmosphere and well washed.

Printing Colors.

a) Printing with Alumina Mordant.

1. *Alizarine Red W B, W R, W Y.*

100 gr. Alizarine Red,
40 " sulphate of alumina, dissolved in
100 " water,
20 " oxalic acid, dissolved in
50 " water,
50 " glycerine,
50 " Turkey Red oil D concent.,
590 " British gum thickening.

1000 gr.

2. *Alizarine Red W A powder.*

30 gr. Alizarine Red W A powder, dissolved in
100 " water,
40 " sulphate of alumina, dissolved in
100 " water,
20 " oxalic acid, dissolved in
50 " water,
660 " British gum thickening.

1000 gr.

3. *Alizarine Orange W O.*

200 gr. Alizarine Orange W O,
30 " sulphate of alumina, dissolved in
100 " water,
25 " oxalic acid, dissolved in
75 " water,
570 " British gum thickening.

1000 gr.

b) Printing with Chrome Mordant.

4. *Alizarine Red W B, W R, W Y.*

200	gr.	Alizarine Red,
50	"	acetic acid 9° T,
100	"	acetate of chrome 20° Bé (made from crystals),
650	"	British gum thickening.
1000	gr.	

5. *Alizarine Red W A powder.*

30	gr.	Alizarine Red W A powder, dissolved in
100	"	water,
75	"	acetate of chrome 20° Bé (made from crystals),
20	"	oxalic acid, dissolved in
50	"	water,
725	"	British gum thickening.
1000	gr.	

6. *Alizarine Orange W O.*

200	gr.	Alizarine Orange W O,
50	"	acetic acid 9° T,
100	"	acetate of chrome 20° Bé (made from crystals),
650	"	British gum thickening.
1000	gr.	

7. *Alizarine Garnet.*

200	gr.	Alizarine Garnet,
75	"	acetic acid 9° T,
125	"	acetate of chrome 20° Bé (made from crystals),
600	"	British gum thickening.
1000	gr.	

8. *Victoria Violet R.*

300	gr.	Victoria Violet R,
30	"	acetate of chrome 20° Bé (made from crystals),
20	"	oxalic acid, dissolved in
50	"	water,
600	"	British gum thickening.
1000	gr.	

9. *Viridine S.*

150 gr. Viridine S,
150 " water,
60 " acetate of chrome 20° Bé (made from crystals),
30 " oxalic acid, dissolved in
50 " water,
560 " British gum thickening.

1000 gr.

10. *Alizarine Blue S W.*

200 gr. Alizarine Blue S W,
40 " acetate of chrome 20° Bé (made from crystals),
760 " British gum thickening.

1000 gr.

11. *Alizarine Blue N R, N B, N G.*

250 gr. Alizarine Blue,
75 " acetic acid 9° T,
75 " acetate of chrome 20° Bé (made from crystals),
20 " oxalic acid, dissolved in
30 " water,
550 " British gum thickening.

1000 gr.

12. *Galloflavine.*

100 gr. Galloflavine,
50 " acetic acid 9° T,
20 " acetate of chrome 20° Bé (made from crystals),
830 " British gum thickening.

1000 gr.

13. *Alizarine Brown O.*

200 gr. Alizarine Brown O,
150 " acetate of chrome 20° Bé (made from crystals),
10 " oxalic acid, dissolved in
40 " water,
600 " British gum thickening.

1000 gr.

14. *Alizarine Black S P.*

250 gr.	Alizarine Black S P,
50 "	acetic acid 9° T,
100 "	acetate of chrome 20° Bé (made from crystals),
30 "	oxalic acid, dissolved in
50 "	water,
520 "	British gum thickening.
1000 gr.	

15. *Alizarine Black S P and Alizarine Blue N D.*

150 gr.	Alizarine Black S P,
125 "	Alizarine Blue N D,
50 "	acetic acid 9° T,
100 "	acetate of chrome 20° Bé (made from crystals),
12.5 "	oxalic acid, dissolved in
25 "	water,
537.5 "	British gum thickening.
1000 gr.	

16. *Alizarine Green S W.*

200 gr.	Alizarine Green S W,
60 "	acetic acid 9° T,
60 "	acetate of chrome 20° Bé (made from crystals),
50 "	oxalic acid, dissolved in
50 "	water,
580 "	British gum thickening.
1000 gr.	

17. *Alizarine Blue J S W.*

200 gr.	Alizarine Blue J S W,
60 "	acetic acid 9° T,
60 "	acetate of chrome 20° Bé (made from crystals),
50 "	oxalic acid, dissolved in
50 "	water,
580 "	British gum thickening.
1000 gr.	

18. *Alizarine Yellow A W or R W powder.*

20	gr.	Alizarine Yellow A W or R W, dissolved in
160	"	water,
50	"	acetic acid 9° T,
100	"	acetate of chrome 20° Bé (made from crystals),
20	"	oxalic acid, dissolved in
50	"	water,
600	"	British gum thickening.
1000	gr.	

c) Printing with Iron Mordant.

19. *Alizarine Orange W O and Alizarine Yellow A W or R W powder.*

150	gr.	Alizarine Orange W O,
20	"	Alizarine Yellow A W or R W powder, dissolved in
50	"	water,
100	"	acetic acid 9° T,
85	"	acetate of iron 15° Bé,
40	"	oxalic acid, dissolved in
40	"	water,
100	"	acetate of lime 10° Bé,
415	"	British gum thickening.
1000	gr.	

No. 408.

PROCESS FOR BLEACHING LOOSE WOOL, WOOL YARN, AND WOOL PIECE GOODS.

For white we must begin with a proper selection of the raw wool. Use only well-selected material, as white as possible, and free from yellow tips. It is best to use two baths.

Bleaching Bath.

(For 22–33 lbs. of goods.)

For 500 quarts of pure cold water, free from iron, take 4 quarts bisulphite of soda 38°–40° Bé and $\frac{3}{10}$ of a quart sulphuric acid 66° Bé. The material, which has previously been well washed and

carefully rinsed, is worked well for 25–30 minutes, and then the liquid is drawn off.

Dye-Bath.

(For about 22–33 lbs. of goods.)

For every 500 quarts of pure water free from iron at 104° F., add, according to the shade desired, $\frac{1}{15}$ oz. *Alkali Violet* pat.; or, if more greenish shades are wanted, about the same quantity of *Soluble Blue I N.* The coloring matter is previously dissolved in 2 quarts of hot water and passed through a flannel sieve.

Enter the goods and dye to the desired shade, working well. Working for one quarter of an hour in the dye-bath is sufficient for fixing the coloring matter.

If sufficient pure water, free from iron, is at hand, rinse after dyeing, and then dry slowly at the *ordinary temperature.*

In many cases where the sulphurous acid remaining in the goods has no injurious effect on the subsequent operations, rinsing may be omitted, and in that case the color will turn out clearer.

REMARKS.

Where no clear water free from iron is at hand, purify the water by boiling with bran; skim and cool to the ordinary temperature.

When several lots are to be dyed white in rapid succession, the baths can be used repeatedly, reducing the amount of bisulphite of soda and sulphuric acid directed above by $\frac{1}{5}$. After the fifth lot, the full amount must be used again.

It is not well to allow the bleaching bath to stand for a *long time,* as the bisulphite of soda is oxidized to Glauber's Salt and then no longer exerts any bleaching power.

The amount of coloring matter required for the subsequent lots of goods depends entirely on the shade desired; no directions can be given on this point.

No. 427.

Directions for Producing a Silky Luster and a Silky Feeling on Wool Yarn dyed with Alizarine Colors.

In order to produce a silk-like luster and feeling on wool yarn, the well-cleaned material is first *treated with chlorine.*

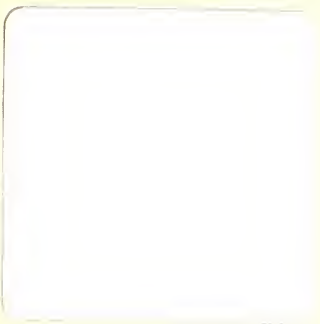
The yarn is worked for 20 minutes in a bath having a temperature of 77°–86° F., which contains $\frac{2}{3}$ oz. hydrochloric acid 20° Bé per quart of water. After wringing slightly, or after the material has drained off, place it in a weak solution of chloride of lime, containing $\frac{1}{2}$ oz. chloride of lime to 1 quart of water, and work well for 20 minutes, keeping it at 68°–86° F. To make and replenish this solution, prepare a stock solution of a definite amount of chloride of lime, which should be filtered before using.

The chlorinated material is *rinsed* well and then mordanted and dyed according to the regular directions. By this treatment with chlorine, the wool fiber has its affinity for mordant and coloring matter increased to such an extent that boiling for half an hour in the mordant bath and for one hour on dyeing is quite sufficient to fix the color lake completely. After rinsing the dyed material is passed through a *solution of soap* containing $\frac{1}{6}$ oz. solid soap per quart of water for $\frac{1}{4}$ hour at 77°–86° F.

Without rinsing, the yarn is now put into a fresh bath containing $\frac{1}{5}$ oz. of sulphuric acid 66° Bé per 1 quart of water, and kept at 77°–86° F.; work for $\frac{1}{4}$ hour, rinse well and dry.

For light tints with Alizarine Yellow as well as those with Alizarine Red and Alizarine Orange on alumina mordant, $\frac{1}{3}$ oz. *acetic acid per quart of water* must be used instead of sulphuric acid.

The baths, with the exception of the dye-bath, are repeatedly used and replenished proportionately.



GETTY CENTER LIBRARY
3 3125 00017 1856